PPC Coatings - Product Information Sheet

Product Description

PPC Coatings Polymorphic Polymers are highly modified rapid curing thermoset resins, applied to new and old concrete, steel, and fiberglass structures that require long lasting protection in severe corrosive and abrasive environments. PPC Coatings are 100% solids without solvent entrapment after cure, which meet or are well below the maximum VOC emissions requirements.

Recommended Uses

- Wastewater Conveyance and Treatment
- Power Generation FGD Duct and Tanks
- Sea Walls, Piers and Breakwaters
- Chemical Storage
- Abrasive & Pedestrian Flooring
- Concrete Spall Repair
- Swimming Pools
- Fiberglass
- Steel Dumpsters, Sweep Truck Tanks
- Pulp and Paper Production
- Food or Chemical Processing
- Salt Storage
- Primary or Secondary Containment
- Freezer Lockers
- Restoration of Corroded Concrete
- Aquaculture
- Agricultural Tanks, Ducts
- Refineries

PPC Characteristics

Rapid Curing in extreme temperatures: PPC is a rapid curing system that can be applied year round from temperatures ranging from minus 40°F to 160°F without the need for external heat assistance. A substrate applied with PPC can be returned to full service within an hour, saving on costly "down time" expenses.

Coefficient of Expansion: PPC Coatings have a coefficient of thermal expansion similar to that of concrete, making PPC highly resistant to cracking and delaminating due to thermal expansion and retraction.

Flexural Strength: PPC will withstand extreme conditions in tanks and steel structures due its flexural strength.

Corrosion Resistance: PPC is resistant to a wide range of chemicals that include alkali, salt, ozone, acids and chlorine. PPC is highly resistant to hydrogen-sulfide gasses and sulfuric acid, establishing the PPC Waste Water Coating System as one of the premier and successful coatings in the industry. PPC is UV resistant enabling any application exposed to direct sunlight.

Abrasion Resistance: PPC provides exceptional abrasion and impact resistance for built up heavy duty flooring systems or thinner light traffic coatings, as well as for patching, joint reconstruction and rehabilitation of industrial surfaces, concrete roads and bridges.

Unlimited Application Thickness: PPC can be applied as a high built up coating system in one or multiple layers. The product may be used as a grout for patching and anchoring, and as a trowel mortar coating system on new surfaces, or for restoration and rehabilitation, on horizontal and vertical surfaces.

Application and Recoating Window: PPC Coatings have no application window limitations. PPC can be recoated within minutes of the previous applied coat, or days to years after the original coating was applied, making it a very practical coating system when application interference occurs, or recoat or repair is required.

Application Versatility: The same base PPC Resin is used for all applications. Aggregate, silica or other filler materials can be added to extend the resin as required for each application. Whether PPC is used as a coating, grouting, waterproofing, or built up trowel application, PPC will maintain its unique physical properties and characteristics.

Practical and Economical: PPC Polymorphic Polymer Resin formula is what creates the physical properties that protect against the corrosive environment, not the buildup of filler materials. This eliminates the need for a thicker costlier build up of coating to protect the substrate. These combined characteristics make PPC a practical and economical long lasting coating.

PPC Resin Types:

All PPC Resins have the same physical properties, chemical resistance, and application features.

All PPC Resins are activated by adding a MEKP activator to the PPC Resin. The amount of MEKP activator added, is between 1% - 2.5% of the weight or volume of the PPC Coating to be applied.

QC Resin:
QC Resin Is the base resin used for Prime Coat in all PPC applications. QC Resin extended with dry clean aggregate of any size, is used for grouting, patching and trowel down floors. QC Resin can also be applied in pure resin form, in continuous coats. QC Resin is applied as a seal coat.

IC-Q :
IC-Q is a factory prepared resin based filler material with unique rheological properties that minimize the possibilities of pinholes and holidays. IC-Q is applied as an intermediate build up coat.

IC-Q mixed with filler is used for repairing bug holes, joints, cracks, and vertical spalls. The mixture is also used for a vertical trowel mortar when a built-up smooth plane finished surface is required, eliminating the need for an underlayment base coat. IC-Q is applied as a light traffic floor coating and can be extended with clean dry aggregate for a trowel down application.

Final Coat:
A final coat is formulated with QC resin mixed with a color pigment, to obtain the desired finish. Final Coat is impervious to algae and bacteria, easily cleaned and maintained, and is suitable for long lasting aquatic and aquacultural applications.

General Application Guidelines:

PPC Coatings can be applied to concrete, steel, and fiberglass, on vertical and horizontal surfaces, with a brush, roller, trowel or sprayer. PPC can be poured into building forms and molds to restore and restructure concrete shapes.

Surface Preparation: All surfaces to be coated must be clean, dry and sound, free from all grease, oil, dust, water, loose matter, release agents, previous coatings, or anything else that may prevent direct contact between the substrate and the coating.

Concrete: Concrete must be fully cured prior to application of PPC Prime Coat. Conventional curing for concrete is 28 days. If rapid curing concrete compounds or systems are used, concrete must be moisture tested by performing a Standard Plastic Tape Down Test (ASTM D4263), or with a suitable instrument, prior to applying PPC Prime Coat. Moisture content in concrete should not exceed 5 %.

Old and new concrete structures must look and feel dry, prior to applying prime coat.

Concrete substrate profile must be course, free of concrete laitance, with exposed aggregate, and a minimum anchor profile depth of at least 1mm / ICRI - CSP 5-6/ similar to a #40-50 Grit sand paper.

Sandblasting, water blasting, scarifying, grinding, and wire brushing, are the recommended procedures to achieve the required surface profile.

Prior to coating, the substrate should have a neutral PH in the range between 5 to 9.

Substrate temperature should be at least 5 degrees above the dew point prior to application.

Steel: Surface must be sandblasted to a clean white metal, at least equal to a SSPC-SP5 finished profile. PPC Prime Coat must be applied immediately after the steel surface has been prepared.

Fiberglass: Surface must be lightly sanded and cleaned prior to the application of PPC Prime Coat

Prime Coat:
A Prime Coat must be applied to all substrates. Prime coat must only be applied to adequately prepared surfaces.

Bug Holes, Holidays, Voids, Cracks, Spalls:
Once Prime Coat has been applied, all defected areas that require patching to create a sound solid surface must be filled with a PPC patching mortar.

Intermediate Coat:
Intermediate Coat is the filler coat applied to create buildup, and is the second coat of the three coat PPC System. Choice of intermediate coat is determined by the function of the structure. IC-Q is applied to protect substrates in highly corrosive conditions. IC-Q with added filler is used as an intermediate coat when a trowel application is applied to a vertical surface. IC-Q can be applied as a thick built up vertical coat, filling deep voids, bug holes, cracks and spalls, creating a protective smooth coat in one application. This application eliminates the need for a built up underlayment coat prior to applying the protective coat. QC Resin with the addition of any size dry clean aggregate will create a grout, used for patching and troweling horizontal surfaces. QC Resin with added extenders can be poured into a form or mold to reconstruct corners, angles etc. QC Resin in liquid form can be applied as an intermediate coat when a thinner protective coat is adequate.

For Steel and fiberglass substrates, a second coat of QC resin is applied as an intermediate coat.

Final Coat:
Final Coat is QC Resin with or without the addition of a color pigment if required. Final Coat is applied as an impervious seal coat, limiting algae and bacteria build up, and is easily cleaned and maintained A Final Coat must be applied as a seal coat on top of all surfaces applied with IC-Q.

PPC Coatings Physical Properties:

Coefficient of Linear Expansion - ASTM D696-90 = 8.8 x 10^{-6}

Abrasion Wear Index - ASTM D4060 = 0.0546 (extended with silica sand) to 0.1414 (film coat of QC Resin Only)

Flexural Strength - ASTM D790 = 17,000 Psi

Compressive Strength - ASTM D695 = 20,000 Psi

Tensile Strength - ASTM D638 = 11,000 Psi

Adhesion - ASTM D1002 = metal to concrete 2,000 N / metal tometal 3,000 N / PPC to concrete, exceeded Elcometer 1000 psi max

PPC Coatings Physical Properties - continued

Salt Fog Testing - ASTM B-117 / ASTM D-714 / ASTM D-610 = Blistering – None, Scribe 1/16", Pinpoint Rust 9

Heat Distortion - ASTM D648 = 240°F

Dry Heat Resistance - ASTM D4541 = 280°F

VOC - ASTM D-3690 = 8 g/l

Chemical Resistance: please refer to chemical challenge chart

Health and Safety: Please refer to MSDS and Product Data Sheet

Comparison of Typical Physical Properties: Concrete and Polymer Coatings

	PPC Coatings	Concrete**	Polyester**	Polyamide Epoxy**	Amine Epoxy**	Urethane**	Furan**
Min. Application Temp.°F	-40	40	40	60	60	60	45
Traffic Limitations - Light Return for Full Service	10 min. to a few hours****	28 days	16 hrs.	24 hrs.	24 hrs.	24 hrs.	24 hrs.
Tensile Strength PSI (MPA)	10,000 (70)	300 (2.1)	2,000 (14)	4,000 (28)	2,000 (14)	1,000 (7)	3,000 (21)
Compressive Strength PSI (MPA)	20,000 (140)	3,500 (24.5)	10,000 (70)	4,000 (28)	6,000 (42)	5,000 (35)	14,000 (98)
Flexural Strength PSI (MPA)	17,000 (120)	-	1,500 (10.5)	1,000 (7)	1,500 (10.5)	1,500 (10.5)	6,000 (42)
Coeff. Of Expansion In/In/F°	$6.4x10^{-6}$	$6.5x10^{-6}$	$36x10^{-6}$	$40x10^{-6}$	$40x10^{-6}$	-	-
Coeff. Of Expansion Cm/Cm/C°	$11.5x10^{-8}$	$11.7x10^{-8}$	$36x10^{-8}$	$72x10^{-8}$	$72x10^{-8}$	-	-
Shrinkage %	Zero, Linear	-	3	0.5	0.5	2	0.21
Adhesion Characteristics	Excellent	-	Poor	Good	Good	Good	Good
Abrasion Resistance	Excellent	-	Good	Good	Good	Good	Good
Resistance to Impact	Excellent	-	Poor	Poor	Poor	Poor	Poor
Resistance to Thermal Shock	Excellent	-	Poor	Poor	Poor	Poor	Poor

Comparison of Chemical Resistance: Polymer Coatings

	PPC Coatings	Coal-tar Epoxy**	Amine Epoxy**	Epoxy Esther**	Polyester**	Polyvinyl**	Urethane**	Chlorinated Rubber**
ACIDS:								
Sulphuric 10%	R*	LR	R	LR	R	R	LR	R
Sulphuric 70%	R	NR	NR	NR	R	NR	NR	R
Hydrochloric 10%	R*	LR	R	LR	R	LR	LR	R
Hydrochloric 35%	R	NR	NR	NR	R	LR	LR	R
Nitric 10%	R*	NR	LR	NR	R	R	LR	R
Nitric 50%	R	NR	NR	NR	NR	NR	NR	NR
Acetic 50%	R*	NR	NR	NR	NR	NR	NR	NR
WATER:								
Distilled	R*	R	R	R	R	R	LR	R
Salt Water	R*	R	R	R	R	R	LR	R
ALKALIES:								
Sodium Hydroxide 5%	R	R	R	R	R	R	LR	R
Ammonium Hydroxide 10%	R	R	R	R	R	R	LR	R
GASES:								
Chlorine	R*	LR	LR	LR	R	LR	LR	R
Ammonia	R	-	-	-	-	-	-	-
Hydrogen Sulfide	R*	R	R	R	R	LR	R	R
ORGANICS:								
Alcohols	R	LR	R	LR	R	NR	NR	LR
Aliphatic Hydrocarbons	R	LR	R	R	R	R	R	LR
Aromatic Hydrocarbons	R	LR	LR	LR	R	NR	R	NR
Ketones	LR	LR	LR	NR	NR	NR	NR	NR
Esters	R*	NR	LR	NR	LR	NR	NR	NR

* Testing to at 150°F (65°C)

** The above charts are reprinted from "Corrison Engineer Reference Book" with permission of the National Association of Chemical Engineers, Houston TX, U.S.A. 1983

*** See PPC Coatings "Chemical Corrosion Reference Guide" for specific recommendations.

**** Maximum achieved

R - Recommended
LR - Limited Recommendation
NR - Not Recommended

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